What is claimed is:

1. Apparatus for treating bone fractures, comprising:

a. stabilizing structure adapted to be connected to a first bone portion and containing a transverse aperture; and

b. a fastening assembly having an engaging member and a compression member, the fastening assembly being adapted to slide within the transverse aperture;

c. wherein the engaging member is adapted to engage a second bone portion, and the engaging member and the compression member are configured so that the compression member contacts and interacts with a portion of the implant and a portion of the engaging member to enable controlled movement between the first and second bone portions; and

d. wherein when installed the compression device contacts the second bone portion.

2. Apparatus according to claim 1 in which the controlled movement between the first and second bone portions includes preclusion of rotation of the portions relative to each other.

3. Apparatus according to claim 1 in which the controlled movement between the first and second bone portions further includes application of compression of the bone portions relative to each other.

4. Apparatus according to claim 1 in which the stabilizing structure is adapted to connect to bone outer surface.

5. Apparatus according to claim 1 in which the stabilizing structure is a bone implant.

6. Apparatus according to claim 1 in which the compression member is adapted, when adjusted, to apply tension to the engaging member and thereby apply compression between the first bone portion and the second bone portion.

7. Apparatus according to claim 1 in which the compression member is at least partially nested with a portion of the engaging member.

8. Apparatus according to claim 1 in which the compression member includes a threaded portion, and the engaging member includes a threaded portion adapted to cooperate with the compression member threaded portion in order to control sliding of the engaging member in the stabilizing structure transverse aperture.

9. Apparatus according to claim 1 further comprising a set screw received in said stabilizing structure, said set screw adapted to preclude sliding of the engaging member in the transverse aperture.

10. Apparatus according to claim 1 in which the transverse aperture is asymmetrical in cross section and includes a first portion adapted to receive at least part of the engaging member and a second portion adapted to receive at least part of the compression member.

11. Apparatus according to claim 5 in which the implant includes a proximal section that is asymmetrical in cross-section about at least one axis.

12. Apparatus for treating a bone fracture, comprising:

a. a stabilizing structure adapted to be connected to a first bone portion and containing a transverse aperture;

b. a fastening assembly adapted to be received in the transverse aperture, comprising:

1. an engaging member adapted to slide in the stabilizing structure transverse aperture and to engage a second bone portion; the engaging member including cooperation structure adapted to cooperate with a compression member;

2. a compression member adapted to be received in the stabilizing structure transverse aperture, and adapted to contact and cooperate with the engaging member to preclude the engaging member from rotating in the transverse aperture, and to control sliding of the engaging member in the transverse aperture,

c. wherein the compression member

1. contacts the second bone portion when installed in order, together with the engaging member, to preclude the second bone portion from rotating relative to the engaging member; and

2. cooperates with the engaging member to preclude rotation of the engaging member relative to the stabilizing structure, and thus preclude the second bone portion from rotating relative to the first bone portion.

13. Apparatus according to claim 12 in which the stabilizing structure is adapted to connect to bone outer surface.

14. Apparatus according to claim 12 in which the stabilizing structure is a bone implant.

15. Apparatus according to claim 12 in which the compression member is adapted, when adjusted, to apply tension to the engaging member and thereby apply compression between the first bone portion and the second bone portion.

16. Apparatus according to claim 12 in which the compression member is at least partially nested with a portion of the engaging member.

17. Apparatus according to claim 12 in which the compression member includes a threaded portion, and the engaging member includes a threaded portion adapted to cooperate with the compression member threaded portion in order to control sliding of the engaging member in the stabilizing structure transverse aperture.

18. Apparatus according to claim 12 further comprising a set screw received in said stabilizing structure, said set screw adapted to preclude sliding of the engaging member in the transverse aperture.

19. Apparatus according to claim 12 in which the transverse aperture is asymmetrical in cross section and contains a first portion adapted to receive at least part of the engaging member and a second portion adapted to receive at least part of the compression member.

20. Apparatus according to claim 14 in which the implant includes a proximal section which is asymmetrical in cross section about at least one axis.

21. A device for treating a bone fracture, comprising:

a. an elongated distal section adapted to be inserted into the medullary canal of a bone;

b. a transition section which provides a shaped coupling between the distal section and a proximal section; and

c. a proximal section including:

1. a transverse aperture adapted to receive structure that is in turn adapted to engage bone;;

2. a lateral aspect;

3. a medial aspect; and

4. at least one cross section oriented substantially perpendicular to the length of the device, wherein the cross section features a moment of inertia that extends toward the lateral aspect from the midpoint of a line that extends in the cross section from the intersection of a tangent on the lateral aspect and the line to the intersection of a tangent on the medial aspect and the line.

22. A device according to claim 21 further comprising a longitudinal aperture extending substantially parallel to the longitudinal axis of the device.

23. A device according to claim 21 in which the cross section is asymmetrical with respect to at least one axis.

24. A device according to claim 21 in which the device is adapted to fit completely within the bone whose fracture is being repaired.

25. A device according to claim 21 in which at least a portion of the surface of the lateral aspect is substantially planar.

26. A device according to claim 21 in which the device is adapted to be at least partially implanted in a first bone portion and further comprising:

d. a fastening assembly having an engaging member and a compression member, the fastening assembly being adapted to slide within the transverse aperture;

e. wherein the engaging member is adapted to engage a second bone portion, and the engaging member and the compression member are configured so that the compression member interacts with a portion of the device and a portion of the engaging member to enable controlled movement between the first and second bone portions; and

f. wherein when implanted the compression device contacts the second bone portion.

27. A nail for treating a femoral fracture, comprising:

a. an elongated distal section adapted to be inserted into the medullary canal of a bone;

b. a transition section which provides a shaped coupling between the distal section and a proximal section; and

c. a proximal section including:

1. a transverse aperture adapted to receive structure that is in turn adapted to engage bone;

2. a lateral aspect;

3. a medial aspect; and

4. at least one cross-section oriented substantially perpendicular to the length of the device, wherein the cross-section is noncircular in shape and includes a medial – lateral axis, wherein the cross-section is symmetrical with respect to the medial – lateral axis and wherein the linear dimension of the cross-

section along the medial – lateral axis is greater than any linear dimension of the cross-section along an axis perpendicular to the medial – lateral axis.

28. Apparatus for treating bone fractures, comprising:

a. an elongated distal section;

b. a transition section which provides a shaped coupling between the distal section and a proximal section; and

c. a proximal section adapted to be connected to a first bone portion, including:

1. a transverse aperture, which transverse aperture includes a longitudinal axis;

2. a lateral aspect;

3. a medial aspect;

4. at least one cross section oriented substantially perpendicular to the length of the device, wherein the cross section features a moment of inertia that extends toward the lateral aspect from the midpoint of a line that is coplanar with the transverse aperture axis and extends in the cross section from the intersection of a tangent on the lateral aspect and the line to the intersection of a tangent on the medial aspect and the line; and

5. a fastening assembly including an engaging member and a compression member, the fastening assembly being adapted to slide within the transverse aperture;

(i) wherein the engaging member is adapted to engage a second bone portion, and the engaging member and the compression member are configured so that the compression member interacts with a portion of the implant and a portion of the engaging member to enable controlled movement between the first and second bone portions; and

(ii) wherein when installed the compression device contacts the second bone portion.

29. Apparatus according to claim 28 in which the controlled movement between the first and second bone portions includes preclusion of rotation of the portions relative to each other.

30. Apparatus according to claim 28 in which the controlled movement between the first and second bone portions further includes application of compression of the bone portions relative to each other.

31. Apparatus according to claim 28 in which the stabilizing structure is a bone implant.

32. Apparatus according to claim 28 in which the compression member is adapted, when adjusted, to apply tension to the engaging member and thereby apply compression between the first bone portion and the second bone portion.

33. Apparatus according to claim 28 in which the compression member is at least partially nested with a portion of the engaging member.

34. Apparatus according to claim 28 in which the compression member includes a threaded portion, and the engaging member includes a threaded portion adapted to

cooperate with the compression member threaded portion in order to control sliding of the engaging member in the stabilizing structure transverse aperture.

35. Apparatus according to claim 28 further comprising a set screw received in said stabilizing structure, said set screw adapted to preclude sliding of the engaging member in the transverse aperture.

36. Apparatus according to claim 28 further comprising a longitudinal aperture extending substantially parallel to the longitudinal axis of the apparatus.

37. Apparatus according to claim 28 in which the cross section is asymmetrical with respect to at least one axis of the cross section.

38. Apparatus according to claim 28 in which the apparatus is adapted to fit completely within the bone whose fracture is being repaired.

39. A device according to claim 28 in which at least a portion of the surface of the lateral aspect is substantially planar.

40. A tool adapted to prepare bone for introduction of a device which includes a proximal portion whose cross section is asymmetrical with respect to at least one axis of the cross section, comprising:

a. a mortise chisel which corresponds in shape, and is adapted to shape bone in a shape corresponding at least partially to the shape of the device's cross section; and

b. a bit adapted to rotate within the mortise chisel and prepare portions of the bone's medullary canal located distally of the portions of bone shaped by the mortise chisel

41. A system for repairing bone, comprising

a. an implant that includes a lateral aspect; a medial aspect; and at least one cross section oriented substantially perpendicular to the length of the implant, wherein the cross section features a moment of inertia that extends toward the lateral aspect from the midpoint of a line that extends in the cross section from the intersection of a tangent on the lateral aspect and the line to the intersection of a tangent on the medial aspect and the line; and

b. a tool adapted to prepare the bone for introduction of the implant, comprising:

1. a mortise chisel which corresponds in shape, and is adapted to shape bone in a shape corresponding at least partially to the shape of the implant's cross section; and

2. a bit adapted to rotate within the mortise chisel and prepare portions of the bone's medullary canal located distally of the portions of bone shaped by the mortise chisel.

42. A process for repairing bone, comprising:

a. providing a device for treating bone fractures, comprising:

1. stabilizing structure adapted to be connected to a first bone portion and containing a transverse aperture; and

2. a fastening assembly having an engaging member and a compression member, the fastening assembly being adapted to slide within the transverse aperture; and

3. wherein the engaging member is adapted to engage a second bone portion, and the engaging member and the compression member are configured so that the compression member contacts and interacts with a portion of the device and a portion of the engaging member to enable controlled movement between the first and second bone portions;

b. connecting the device to the first bone portion;

c. preparing at least one opening in the first bone portion corresponding in location and orientation to the engaging member and to the compression member;

d. engaging the second bone portion with the engaging member;

e. inserting the compression member so as to contact the second bone portion; and

f. causing the compression member to interact with a portion of the engaging member and thereby apply compression to the second bone portion relative to the first bone portion.

43. A process according to claim 42 in which connecting the device to the first bone portion comprises attaching the device to an outer surface of the first bone portion.

44. A process according to claim 42 in which connecting the device to the first bone portion comprises inserting the device in the first bone portion.

45. A process according to claim 42 in which the second bone portion is a femoral head.

46. A process according to claim 42 in which preparing at least one opening in the first bone portion corresponding in location and orientation to the engaging member and to the compression member comprises preparing openings in the bone portion which are not coaxial with respect to each other.

47. A process according to claim 42 in which the device is an implant which includes a proximal portion that includes a cross section which is asymmetrical with respect to at least one axis of the cross section, and connecting the device to the first bone portion includes:

a. preparing interior portions of the bone using a tool which in turn includes a mortise chisel adapted to shape the bone corresponding at least in part to the shape of the implant proximal portion cross section; and

b. inserting the implant into the bone as shaped by the tool.

48. A process for stabilizing bone, comprising:

a. providing an implant which includes a distal portion and a proximal portion that includes a cross section which is asymmetrical with respect to at least one axis of the cross section;

b. preparing interior portions of the bone using a tool which includes a mortise chisel adapted to shape the bone corresponding at least in part to the shape of the implant proximal portion cross section a bit adapted to rotate relative to the mortise chisel for preparing at least part of the bone to receive the distal portion of

the implant, the preparation including shaping portions of the bone with the mortise chisel and further including causing the bit to rotate relative to the mortise chisel and thus prepare at least part of the bone to receive the distal portion of the implant; and

c. inserting the implant into the bone.

49. A process according to claim 48 in which the implant includes a transverse aperture and a fastening assembly having an engaging member and a compression member, the fastening assembly being adapted to slide within the transverse aperture; and wherein the engaging member is adapted to engage a femoral head, and the engaging member and the compression member are configured so that the compression member contacts and interacts with a portion of the implant and a portion of the engaging member to enable controlled movement between the bone and the femoral head; the process further comprising:

a. preparing at least one opening in the bone corresponding in location and orientation to the engaging member and to the compression member;

b. engaging the femoral head with the engaging member;

c. inserting the compression member so as to contact the femoral head; and

d. causing the compression member to interact with a portion of the engaging member and thereby apply compression to the femoral head relative to the bone.